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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,990	07/27/2001	Yukihisa Takeuchi	789_038 DIV	1562

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EXAMINER	
PATEL, ISHWARBHAI B	
ART UNIT	**PAPER NUMBER**
2827	

DATE MAILED: 01/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	9/916,990		
	Examiner	Art Unit	
	Ishwar Patel	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-14,16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-14,16 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/435,191.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to because the figures are improperly cross-hatched.

The cross hatching pattern shown for the masking film 72 in figure 9A-9B is not representing the correct cross hatching patterns.

All of the parts shown in section, and only those parts, must be cross-hatched. The cross hatching patterns should be selected from those shown on page 600-114/115 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP § 608.02.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 12, 13, 14 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 12 and 17, the applicant is claiming the wiring patterns formed in an aligned manner (claims 12 and 17) and the difference between an

average thickness of odd numbered patterns and average thickness of even numbered patterns not more than 5% of an overall average thickness (claim 12), is confusing. It is not clear what is aligned manner and what is odd numbered patterns and even numbered patterns and what structural limitation is claimed by aligned manner, odd numbered patterns and even numbered patterns. It looks the applicant is claiming a process of forming the wiring patterns and is a process limitation in the product claims.

Regarding claim 13, the applicant is claiming the positive pattern section, a negative pattern section and the ratio of positive pattern section and negative pattern section of the mask. However, the mask is not a part of the final product. Mask is used in the process of creating the patterns.

It is unclear what structural limitation is claimed than those patterns claimed in claim 11.

Regarding claim 14, the applicant is claiming a plating layer on the mask. However, the mask is not a part of the final product. Mask is used in the process of creating the patterns.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 11-14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haq et al., US Patent No. 6,041,496, hereafter Haq, in view of Nakata et al., US Patent No. 6,047,893, hereafter, Nakata.

Regarding claim 11 Haq discloses a circuit board comprising:

a substrate (substrate 50, see figure 6, column 19, line 33-43),

a plurality of screen-printed patterns formed on said substrate, each of said screen-printed patterns including a capacitor element; and a gap disposed between said plurality of screen-printed patterns (substrate 50 with circuit patterns 70-72, including resistor, capacitor or inductor, see figure 6, column 19, line 33-43), but

fails to explicitly disclose said gap not more than 40 μm.

However, Haq further discloses that the circuit patterns 70-72, including resistor, capacitor or inductor, includes patterns formed of thin film or thick film pastes, ink or other material suitable for forming electrically conductive pathways, column 5, line 38-43 and column 9, line 40-50, and with thin wiring patterns the respective gap between the pattern will be smaller than that of thick patterns.

Nakata discloses a fine thick film screen printed wiring pattern having a line width of about 10-25 μm with a line spacing as small as 15 μm formed with high precision and at a relatively low cost, which allow a large current flow to pass there through, column 17, line 55-65.

A person having ordinary skill in the art would have recognized the advantage of forming a thin wiring patterns with smaller gap, from the teachings of Nakata, to have a wiring pattern with high precision and low cost and which allow a large current to flow there through.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit patterns of Haq with a gap not more than 40 μm, from the teachings of Nakata, in order to the have a wiring board having patterns with high precision and at lower cost, which allow a large current to flow there through.

Regarding claim 13 and 14, the combination of Haq and Nakata further discloses the screen-printed patterns comprise a printing ink, as applied to claim 11 above.

Regarding claim 16, the applicant is claiming the plurality of screen-printed patterns comprises a single screen-printed layer on said substrate formed by a one-time screen-printing application.

The combination of Haq and Nakata discloses all the features of the claimed invention as applied to claim 11 above, but fails to explicitly disclose the plurality of screen-printed patterns comprises a single screen-printed layer on said substrate formed by a one time screen printing application.

The screen-printing will be carried out depending upon the required thickness of the patterns based on various factors such as the density of the ink / paste, thickness of mask etc.

However, how many times the screen-printing is carried out is a process limitation. Such a process limitation defines the claimed invention over the prior art to the degree that it defines the product itself. A process limitation cannot serve to patentably distinguish the product over the prior art; in the case the product is same as, or obvious over, the prior art. See Product-by-Process in MPEP § 2113 and 2173.05 (p) and *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985).

6. Claims 12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Haq and Nakata, as applied to claim 11 above, and further in view of Hayakawa et al., US Patent No. 5,624,782, hereafter, Hayakawa.

Regarding claims 12 and 17, as best understood, the applicant is claiming a difference between the thicknesses of each pattern not more than 5% of an overall average thickness of the patterns.

Haq is silent about the difference between the thicknesses of each patterns compare to an overall average thickness.

Nakata discloses a method for forming a wiring patterns with high precision as applied to claim 11 above and further discloses in example 9, column 30, forming a bump with 50 μm diameter with a variation in height by about 1 μm, which is well below the claimed range of not more than 5 %.

Hayakawa et al., discloses (in the back ground disclosure, column 1, line 40-6) that a variation in thickness and pattern precision will change the desired characteristic of the wiring patterns formed on the circuit board, column 1, line 40-60.

A person having ordinary skill in the art would recognize the advantage of providing uniform patterns in order to have desired characteristic from the teachings of Nakata and Hayakawa.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit pattern of Haq with a difference between the thickness of each patterns not more than 5% of an overall average thickness of the patterns, from the teaching of Nakata and Hayakawa, in order to have desired characteristic of the wiring patterns.

Response to Arguments

7. Applicant's arguments filed August 25, 2003 have been fully considered but they are not persuasive.

The applicant argues that:

(a) "the patterns which are "screen printed" are structurally ***distinguishable*** from patterns formed by other method", and give examples of galvanized metals, positive ion-doped semiconductor layers, etc. However, does not state any structural ***difference*** of screen-printed patterns and the patterns formed by other methods. Galvanized metal, is not only, distinguishable, but have different structural characteristics than non-galvanized metal.

(b) Nakata does not refer to screen-printing:

Nakata discusses screen-printing using a screen mask; figure 2e, column 14, line 27-33.

(c) The circuit structure of the present invention uses a special screen mask:

Produing circuit patterns using a special screen mask is a process limitation for obtaining a structure. The structure will not be limited by the method of making the structure.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Collins discloses a printing screen and a method of printing patterns of varying thickness.

Cutcher discloses a method for making a printing screen and printing a variable thickness patterns.

Oates discloses a composite stencil for screen.

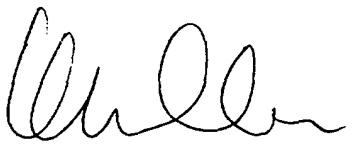
9. Applicant's amendment necessitated the new ground(s) / new explanation of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0658.



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December 26, 2003